

Non-Variceal Upper Gastro-Intestinal Bleeding

Acute Upper GI Bleeding: A Lethal Disease

Outcomes include

DEATH

CARDIAC ARREST

MI

CVA

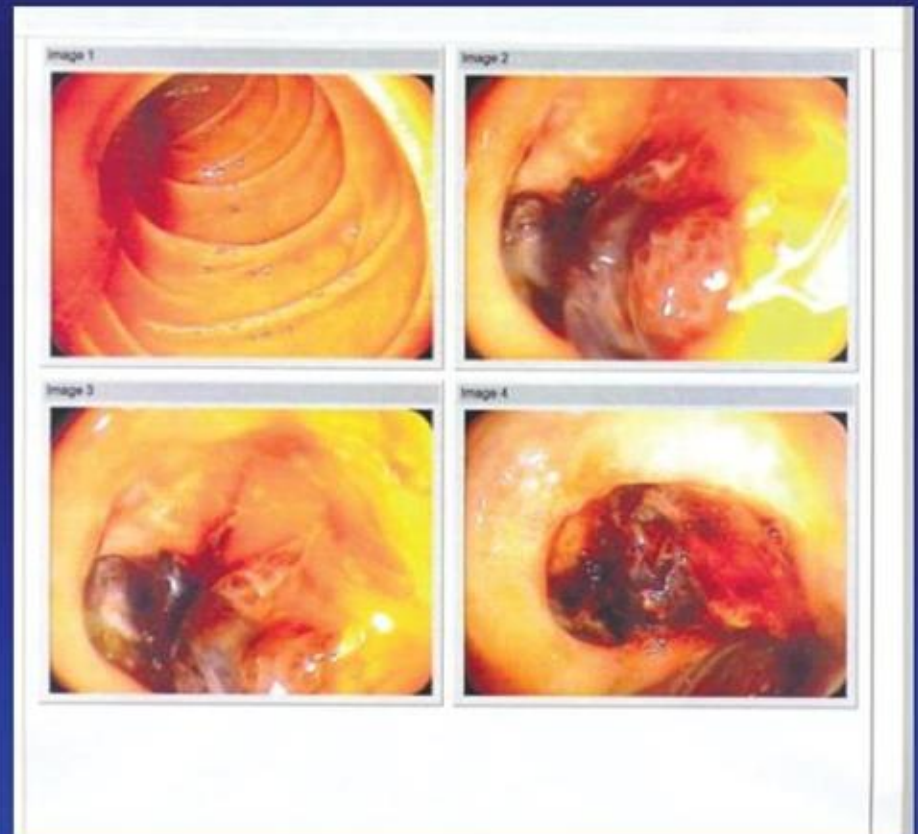
INJURY (e.g. Fx, head)

SEIZURES

SURGERY or ANGIOGRAPHY

RISK FOR FUTURE BLEEDING

ASA-associated DU eroding into GD artery

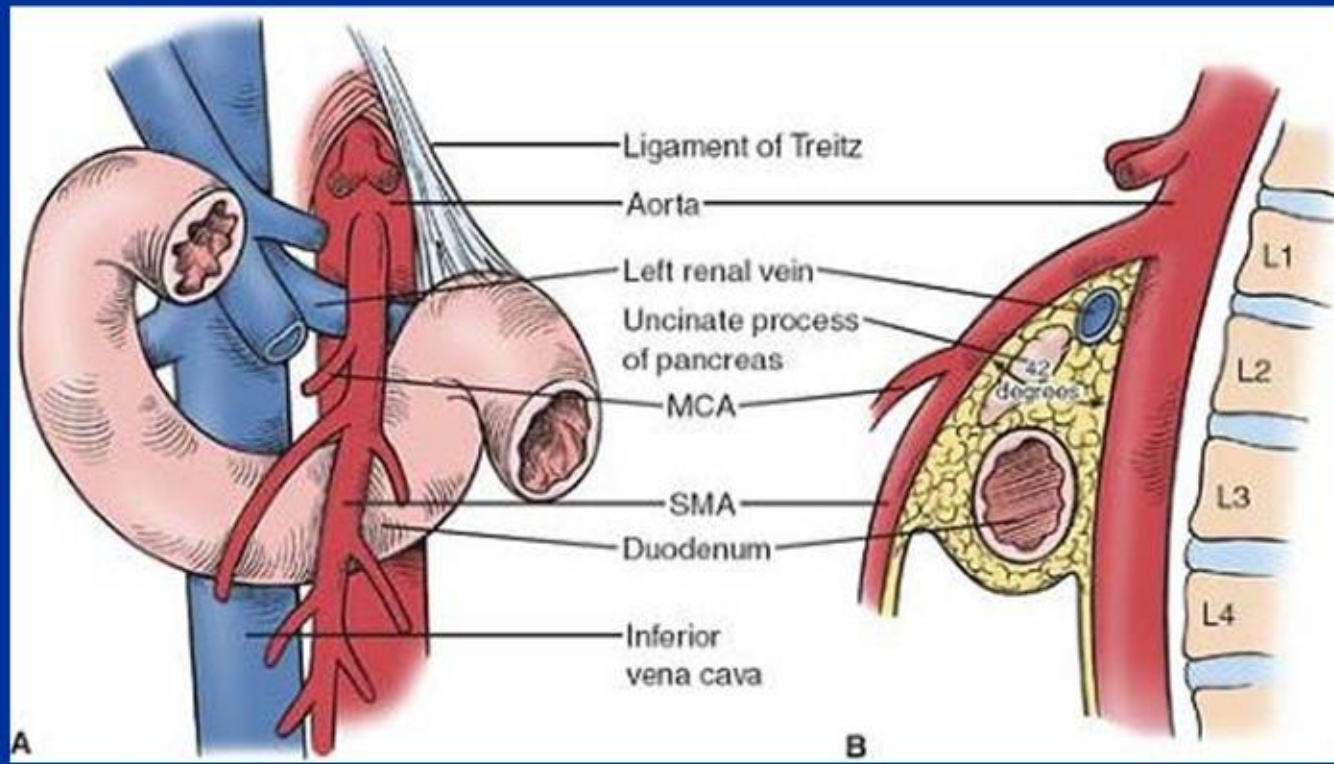


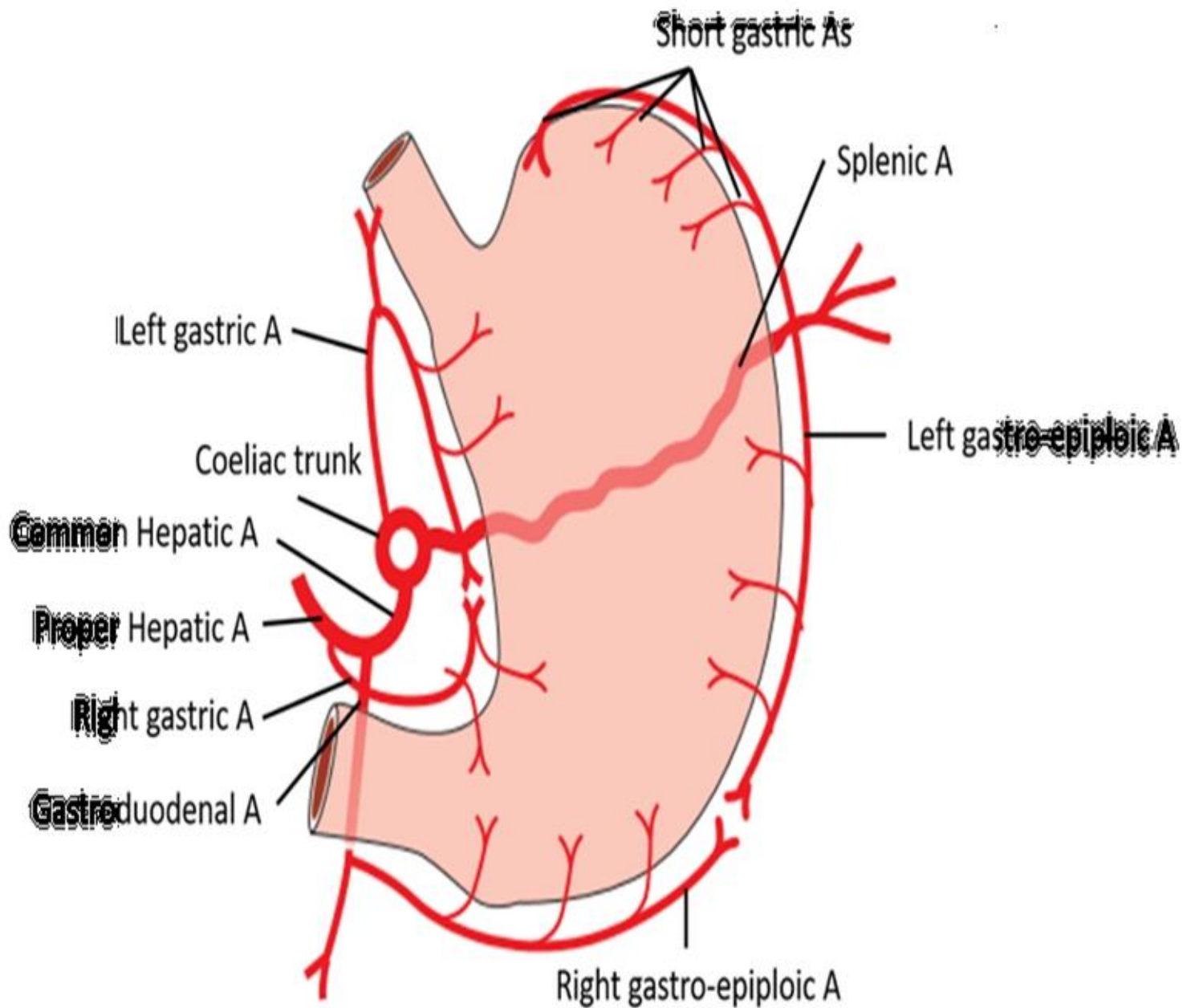
(Upper GI Bleeding) UGIB

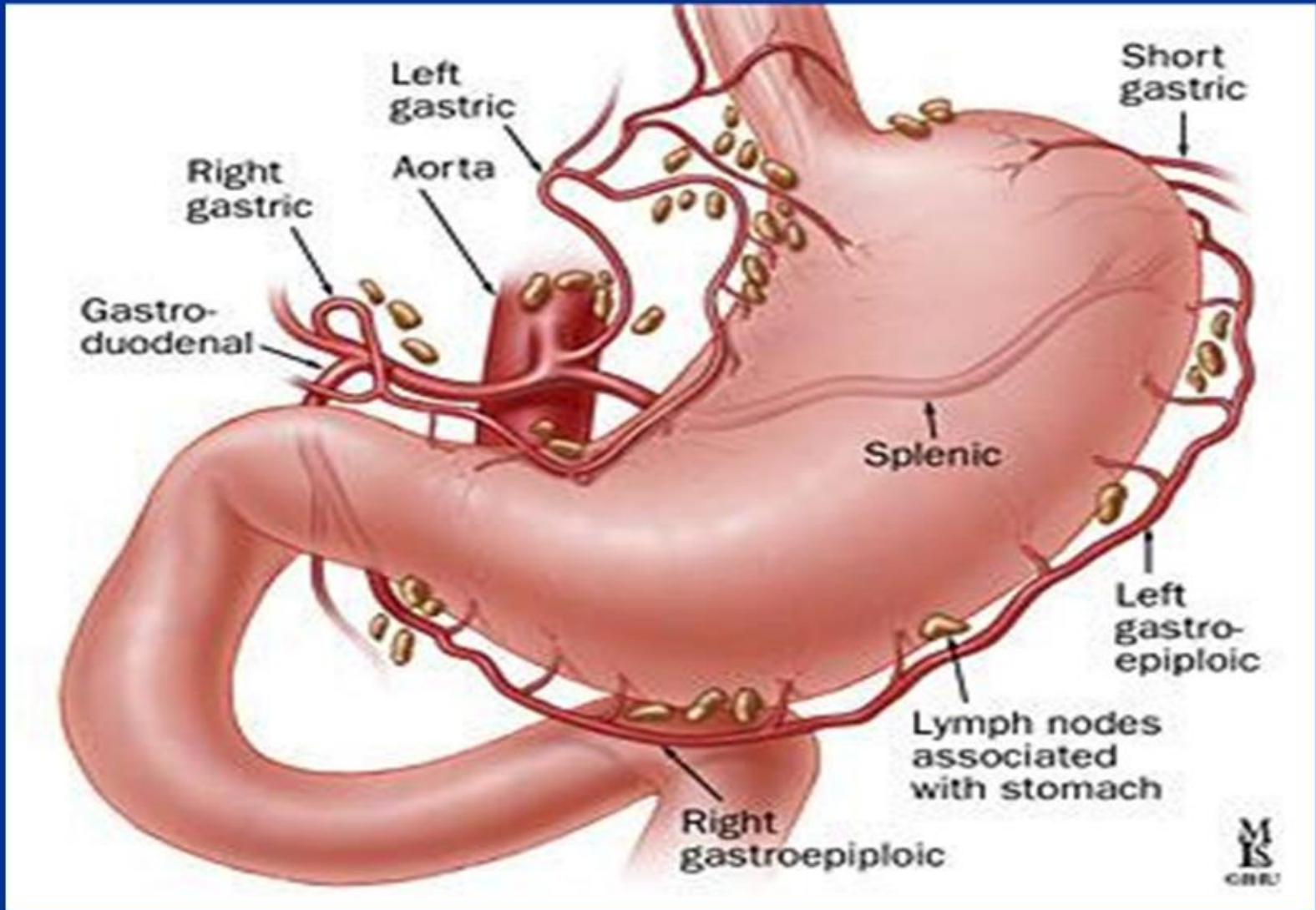
Is bleeding proximal to:

“Ampulla of Vater or (precisely) Ligament of Treitz”

(50% of all GI Bleeding)







UPPER GI BLEEDING

Signs and Symptoms

- Hematemesis
- Melena
- Dizziness
- Abd. Pain and symptoms of Peptic ulcer disease
- Hx of NSAID's use
- Pallor
- Hypotension
- Orthostasis
- Jaundice and other stigmata of chronic liver diseases

HCO₃ & Mucus

(1) The mucosal barrier is a thick, alkaline, unstirred, aqueous layer of dissolved **bicarbonate & mucus**, which neutralizes the effects of gastric juice H⁺.

(2) (Gastric surface mucus cells) & (duodenal enterocytes & goblet cells) with a **lipid bilayer membranes** forming a barrier to H⁺ & **tight junctions** between cells

Blood Flow

Sub-mucosal blood flow drains H^+ away from the mucosa & buffers H^+ w/plasma HCO_3^- & proteins.

pH gradient changes from the gastric lumen pH of 2.0, the mucosal cell surface of pH 7.0, the mucosal cell interior pH of 7.0, and the circulating blood pH of 7.4.

Blood Flow

If HCO₃ secretion ↓: when proteolysis of mucus is ↑ (as in **inflammation**), or when mucosal blood flow is ↓ (as with using **NSAIDs**), intracellular acidosis occurs, leading to cell necrosis.

PGs

Prostaglandins protect gastro-duodenal mucosa by **secretion of mucus, (PG-E2) bicarbonate secretion & maintenance of blood flow** during periods of potential injury. Mucosal peptides and growth factors, including trefoil-family peptides and transforming growth factor alpha, also participate to ensure normal epithelial function by regulating responses to injury.

PGs

NSAIDs, which block the synthesis of prostaglandins, predispose to mucosal injury and peptic ulceration.

H. Pylori

Pan-Gastritis (Body + Corpus)

“Early life infection”

- Multifocal/Pan-gastric gastritis →
Antral & Corpus Atrophy (**parietal cell loss**) +
intestinal metaplasia →
↓HCL outputs → **↑risk for GU & Adeno-Ca**
- Depletion of antral somatostatin effect →
↑gastrin levels.

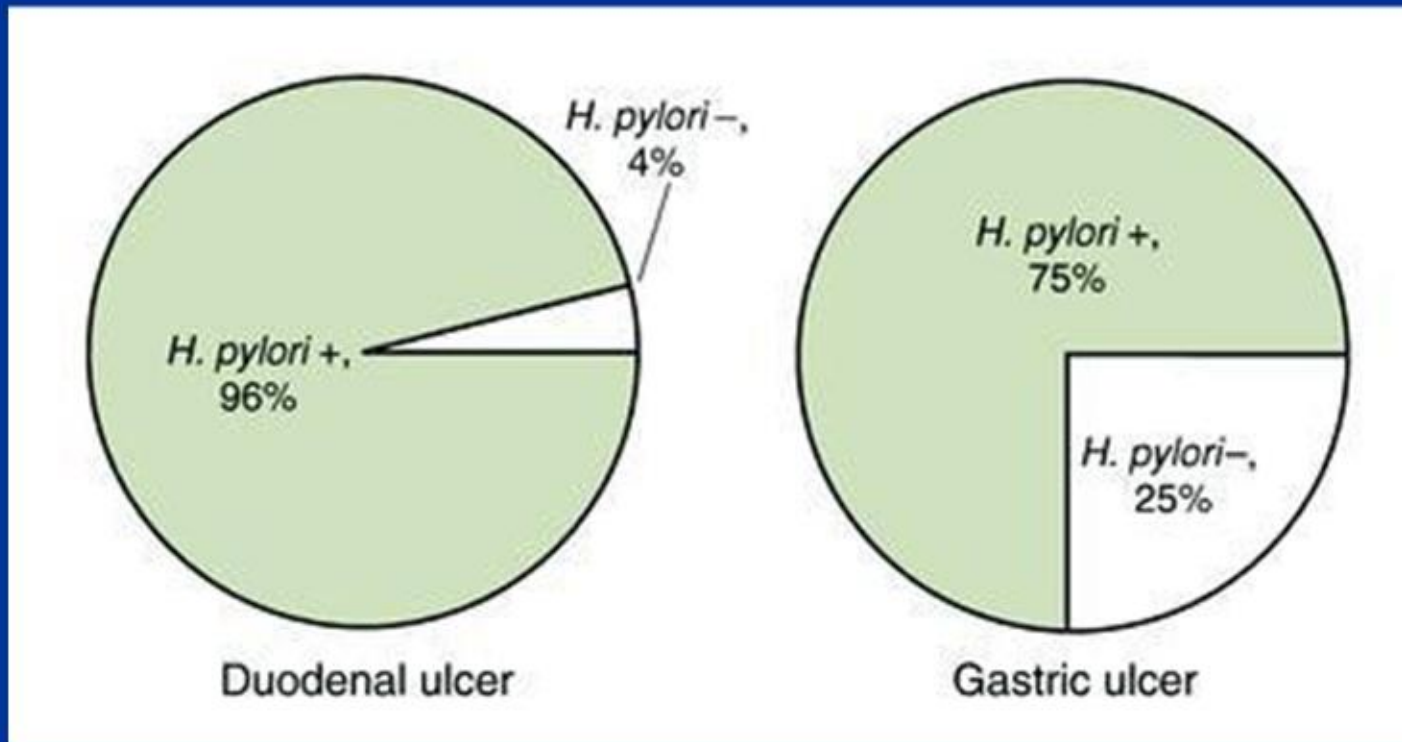
Antral Gastritis Only (↑ %)

“Late life infection”

- Antral-predominant active chronic gastritis →
Antral Atrophy & ↓ antral D cells → (Corpus-sparing) →
↑HCL output → ↑risk for DU + duodenal
gastric metaplasia → HP colonize duodenum
- Depletion of antral somatostatin effect →
↑gastrin levels.

UPPER GI BLEEDING

Peptic Ulcer Disease



UGIB Bleeding forms

Melena: occurs w/ \geq 100mL blood is instilled into UGI tract

Hematochezia: occurs w/ \geq 1,000mL blood is instilled into UGI tract

(Hematochezia is a sign of severe bleeding (if associated w/red NGT aspirate (mortality \uparrow to \approx 30%))

Bleeding & Laboratory Values

One PRBC unit will raise the hematocrit of a standard adult patient by **3%**

One PRBC unit has a standard vol. of **300 mL**

One PRBC unit is expected to \uparrow Hb by **1g/dL**

Bleeding & Laboratory Values

Significant Hb drop 2ry to a bleeding:

Hb $\downarrow \geq 2\text{g}$ from baseline

Hct $\downarrow \geq 6\%$ from baseline

Don't use Hb/Hematocrit to evaluate or monitor acute bleeding (Pt bleeds whole blood; hematocrit may not \downarrow immediately w/acute bleeding.

Extravascular fluid will enter the vascular space \rightarrow restore vol. for up to 72 hrs \rightarrow subsequent \downarrow in hematocrit for few days after bleeding has stopped)

Hemodynamics

Orthostais is the most accurate non-invasive indicator of severity of Blood loss $\approx 20\%$

Orhtostasis = \downarrow Sys BP >20

or

\downarrow Dias BP >10

or

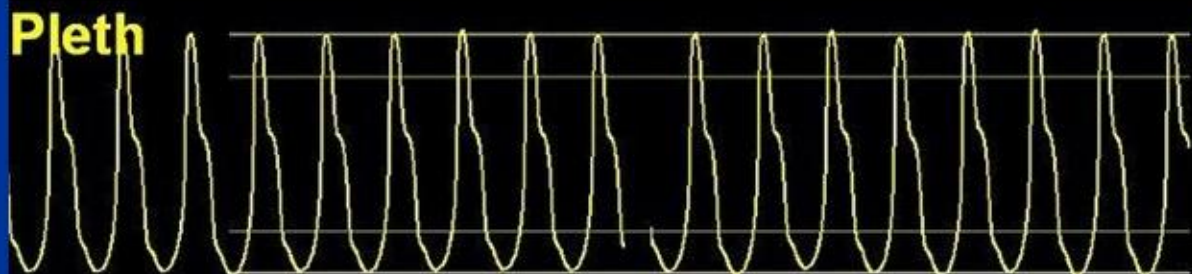
\uparrow HR >20

w/in 3 minutes of standing

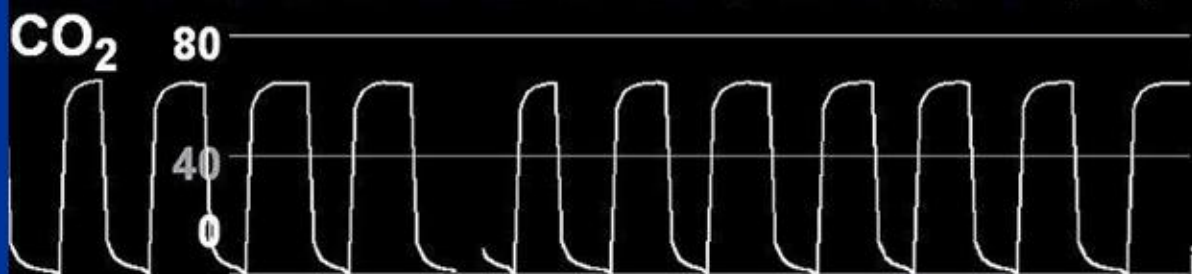
✓ ** etCO₂ HIGH



HR
130
50
110



SpO₂
100
90
90



etCO₂
66
25
60

NBP
Sys. **103/60**
160
90
(74)

Pulse
130
50
110

awRR
30
8
20

Navigation bar with icons for Silence, Pause Alarms, Start Stop, Graph Trends, 12-lead ECG, Main Setup, and Main Screen.

Tachycardia

Bleeding Peptic Ulcer

- 250,000-300,000 admissions / year
- \$2.5 Billion in costs
- Re-bleeding rate after hemostasis about 20%
- Mortality remains 5 – 14%

General Approach to the patient with Acute Upper GI Bleeding

- Guiding Principles
 - Restoration or maintenance of hemodynamic stability
 - Blood products if needed
 - Nasogastric lavage
 - Endoscopy with hemostasis if indicated
 - Antisecretory medications
 - Surgery if necessary

1) Hemodynamic Stabilization:

- Adequate IV access
- Volume resuscitation

2) NPO

3) NGT Lavage

(NO proven Benefit)

(15% False)

4) Transfuse PRBCs if: $Hb \leq 7g/dL$

(Hct: $<21\%$)

($Hb \leq 9-10g/dL$

(Hct: $<30\%$) in CAD)

or

Shock

5) co-morbidities assessment:

- **Stabilization of other active co-morbidities before EGD**

(Rarely, massive bleeding cannot be stabilized adequately before EGD).

- **Intubation for airway protection should be considered w/ [(ongoing hematemesis) or (active bleeding w/ ↓ CNS or loss of the gag reflex)].**

6) Risk assessment

(see below)

7) ± Prokinetics prior to EGD

(Erythromycine: 250mg IV (3mg/kg)

30-60min before EGD

8) Urgent (Only when Stable)

EGD w/in 24hrs (↓ transfusion need, emergent Sx, rebleeding & Hospital stay)

(no change in mortality or ↓ in the need for Sx if EGD done w/in 6hrs) specially if: Ca, cirrhosis, hematemesis, shock, Hb<8g/dL.

9) ± Initiate IV PPI infusion

(Bolus 80mg → 8mg/h) (to maintain)

↓ need for EGD ttt

(no change in: Re-Bleeding, need to transfuse, need for Sx, or Mortality)

↓ high risk stigmata & need for EGD ttt

• PPI → pH > 6 →

Prevent clot lysis (pH > 5) & ↑ Plts aggregation (pH > 6)

• pH > 4: prevent Stress Ulcers).

Causes of Acute Upper GI Bleeding

<u>Cause</u>	<u>Frequency (%)</u>
Peptic Ulcer	40
Esophagitis	10
Erosive disease	6
Other	6
Mallory-Weiss	5
Varices	5
Neoplasm	4
No cause identified	24

Gastric ulcers presenting with acute upper GI bleeding

spurt



Visible vessel



adherent clot



Spots
Dots



Forrest Classification

Stigmata of hemorrhage	Forrest classification
Active spurting bleeding	IA
Active oozing bleeding	IB
Non-bleeding visible vessel	IIA
Adherent clot	IIB
Flat pigmented spot	IIC
Clean base	III

GI Bleed: Risk of Rebleeding

Clean Base Flat Spot Adherent Clot NBVV* Active Bleed



Prevalence (%)	42	20	17	17	18
Rebleeding risk (%)	5	10	22 †	43 †	55 †
Mortality (%)	2	3	7	7	11

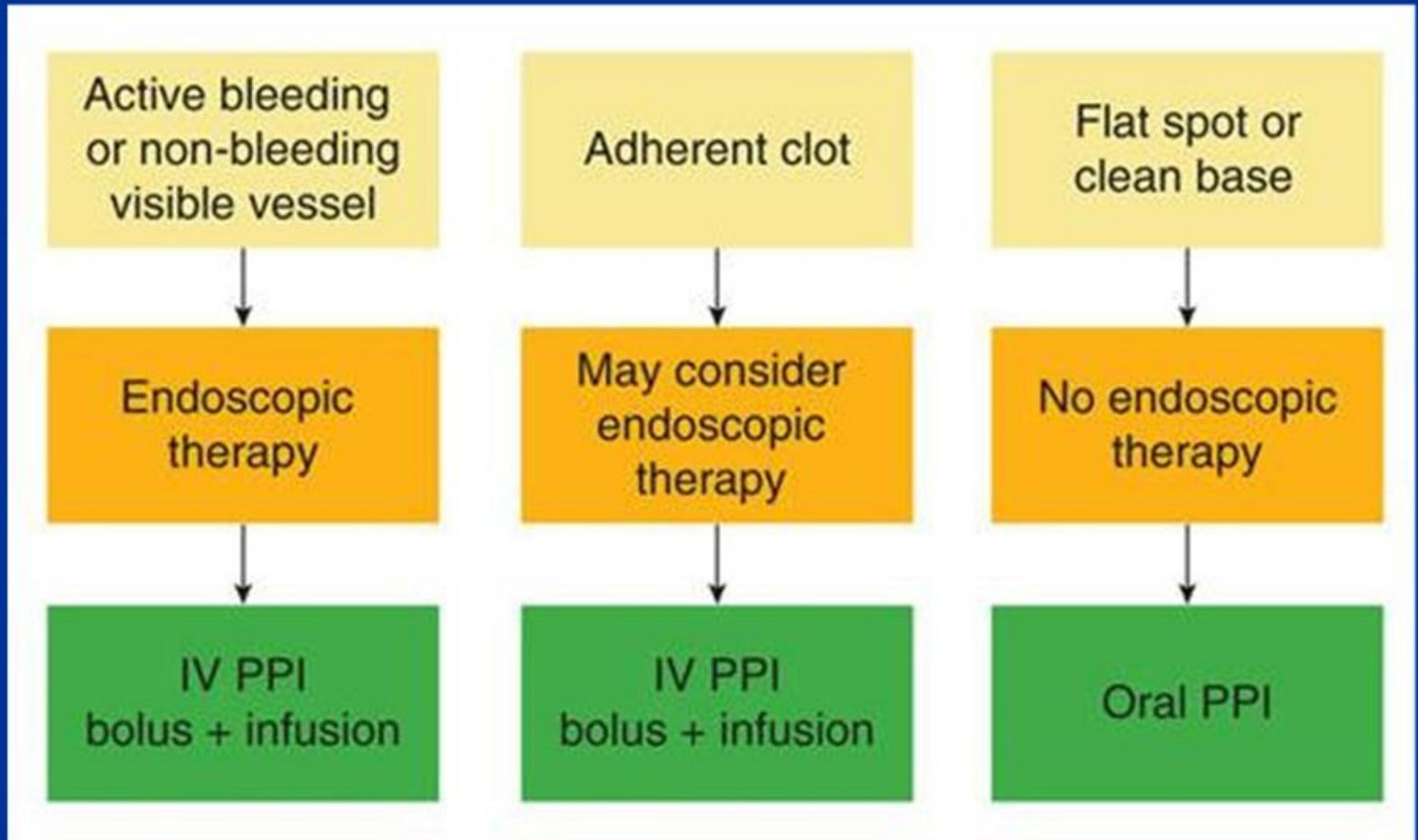
*Nonbleeding visible vessel. † Endoscopic therapy recommended.

Adapted from Laine L, Peterson WL. *N Engl J Med*. 1994;331:717-727.

Endoscopic Therapy

Lesion (Risk: ↑ ↓) • Rebleed Risk		EGD ttt (if indicated → successful >90%)			+PPI	
1ST LOOK EGD "Forrest Classification"	Spurting Vessel (Pulsatile Bleeding) (IA) w/o ttt: 90%		Epinephrine (1:10,000) inj x 4 quad →	Heater probe (Superior if ASA not needed) (Best Mono) or (alt) Hemo-clip (Better if ASA needed)	High-dose IV PPI (80mg IV bolus ↓ 8mg/hr x 72hrs) (Further ↓ rates of rebleeding to <10%) "No change in mortality"	
	Blood oozing ulcer (IB) w/o ttt: 25%	or	Epinephrine (1:10,000) inj x 4 quad			
		or	Heater probe			
		or	Hemo-clip			
	Visible Vessel (NBVV) (Pigmented Protuberance) (IIA) w/o ttt: 50%	V	Heater probe (best for: firm ulcers (scarring), High lesser Curve (difficult location)) ★ Yet, + Epinephrine Inj is Advisable Yet No benefit	or (alt)		Hemo-clip
		V	Hemo-clip			
	Adherent clot (IIB) w/o ttt: 33% (= clot on ulcer w/resistance to several min of H ₂ O jet irrigation)		Epinephrine (1:10,000) inj x 4 quad →	piecemeal cold snaring resection (until underlying stigmata appears or clot becomes ≤3mm) →		Heater probe or (alt) Hemo-clip
	Blood w/No lesion seen		<ul style="list-style-type: none"> Bleeding from (gastric fundal Dieulafoy lesion, hemobilia) • Blood obscuring view on initial EGD ↓ ± (Erythromycin 250mg IV or Metoclopramide 10mg IV 20min prior to EGD) Repeat EGD ± Duodenoscope (view papilla) w/in 24 hrs ★ (Dieulafoy ttt = Spurting Vessel) 			
	★ Clip may be preferred (over thermal ttt) in case of coagulopathy ★ Clip is preferred (over thermal ttt) in case of 2 nd EGD ttt if w/Thermal ttt on 1 st EGD					
	"All above" need Hospitalization x 72hr (Max Re-bleeding Risk w/in 1 st 72hrs): ICU x 24hrs → Ward x 48hrs → D/C		Feeding: after 4-6 hr; start Clear liquid diet after procedure x 48hrs → advance to Regular			
Flat pigmented spot (IIC) w/o ttt: 5-10%	No EGD ttt needed			★ (No benefit from ↑ dose IV PPI) (Unless to continue ASA as 2ry prophylaxis for CAD) ↓ PO PPI QD		
Clear base Ulcer (>50%) (III) w/o ttt: <5%	(Clear base ulcer is described only after H ₂ O jet irrigation) No EGD ttt needed + (Bx ulcer edges + R/O H. Pylori) → No need for further w/u (Colonoscopy/Capsule) (Clean Based Ulcer even w/out stigmata of recent bleed = an identified source of GI Bleeding) → D/C Home "same day" on PPI					
Hospitalization (None): D/C Home		Feeding: after 4-6 hr; start Regular Diet after procedure				

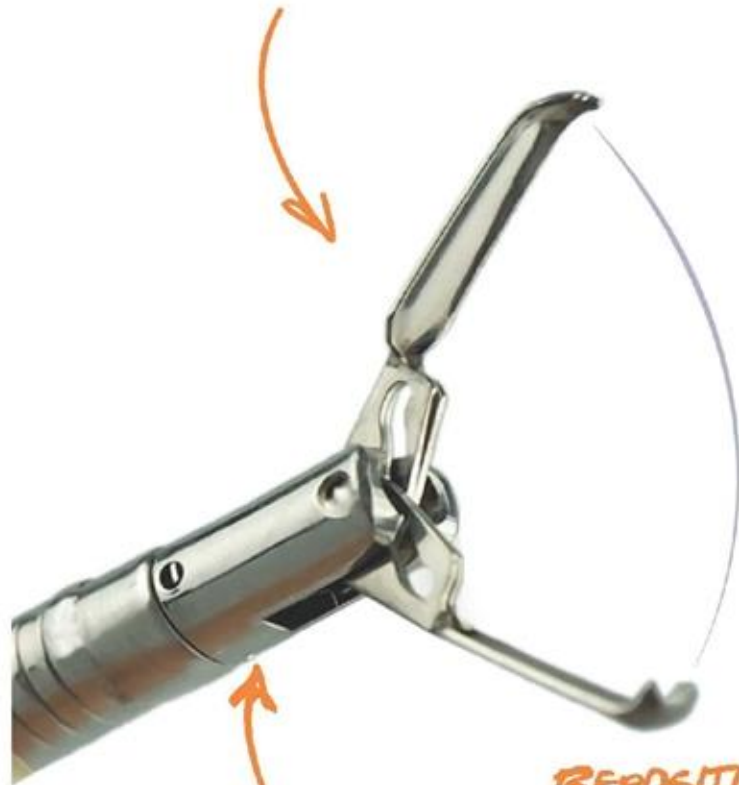
Management





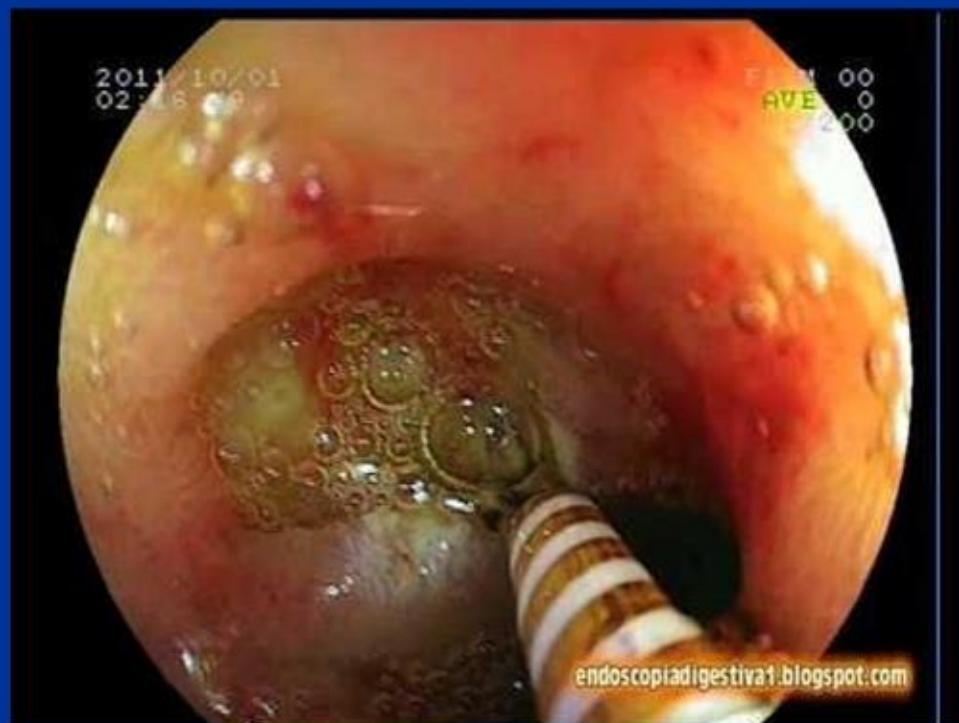
DR. MURRA

360
ROTATION



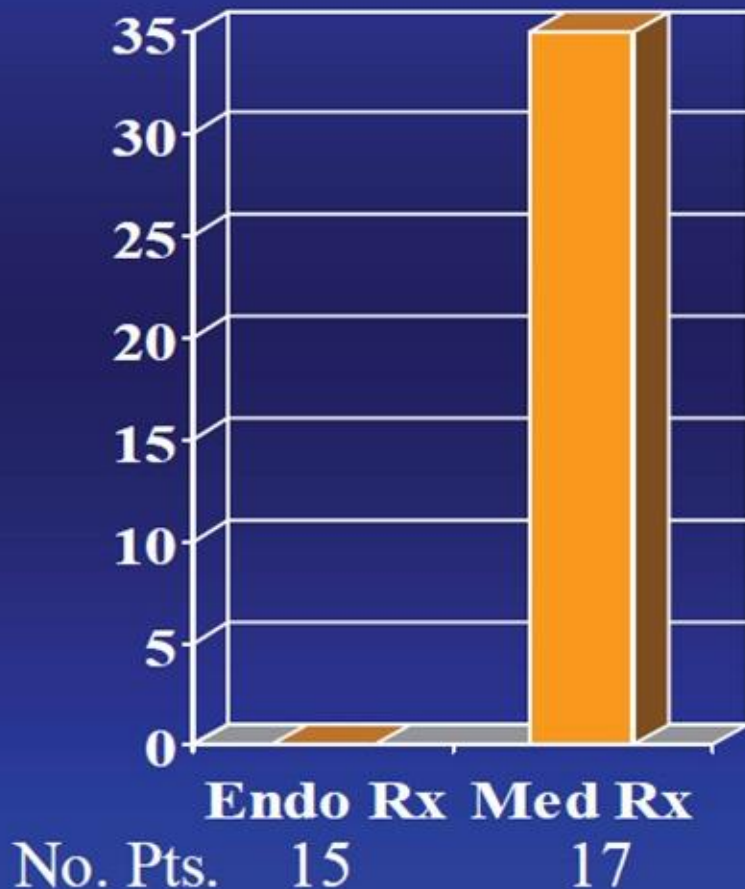
REPOSITIONABLE

SHORT
STEM





Management of the Adherent Clot Leans Towards Intervention



$p = 0.011$

Both groups
received **ORAL**
PPI therapy

Endo Rx = Cold
snare plus dual
modality
intervention

Endoscopic hemostasis: Efficacy in nonvariceal UGI bleeding

- 30 RCTs reviewed
- Almost all patients had bleeding ulcers
- Thermal, laser and injection therapy all decreased
 - re-bleeding (OR 0.38)
 - surgery (OR 0.36)
 - mortality (OR 0.55)in patients with active bleeding or visible vessels but not those with flat spots or adherent clot.

Endoscopic Hemostasis: Technique in bleeding ulcers

- Epinephrine less effective than thermal methods or hemoclip in RCTs
 - latter may be safer
- Epinephrine + thermal methods or hemoclip
 - superior to epinephrine alone
 - not superior to thermal or hemoclip alone
- Repeat endoscopy for recurrent bleeding following hemostasis reduces the need for surgery without increasing complications

H₂-receptor antagonists in upper GI bleeding

- Widely used with little / no supporting evidence
- No evidence for any useful effect in NVUGIB
- No reduction in mortality or re-bleeding in patients with bleeding DU
- Possible small improvements in outcomes in patients with bleeding GU

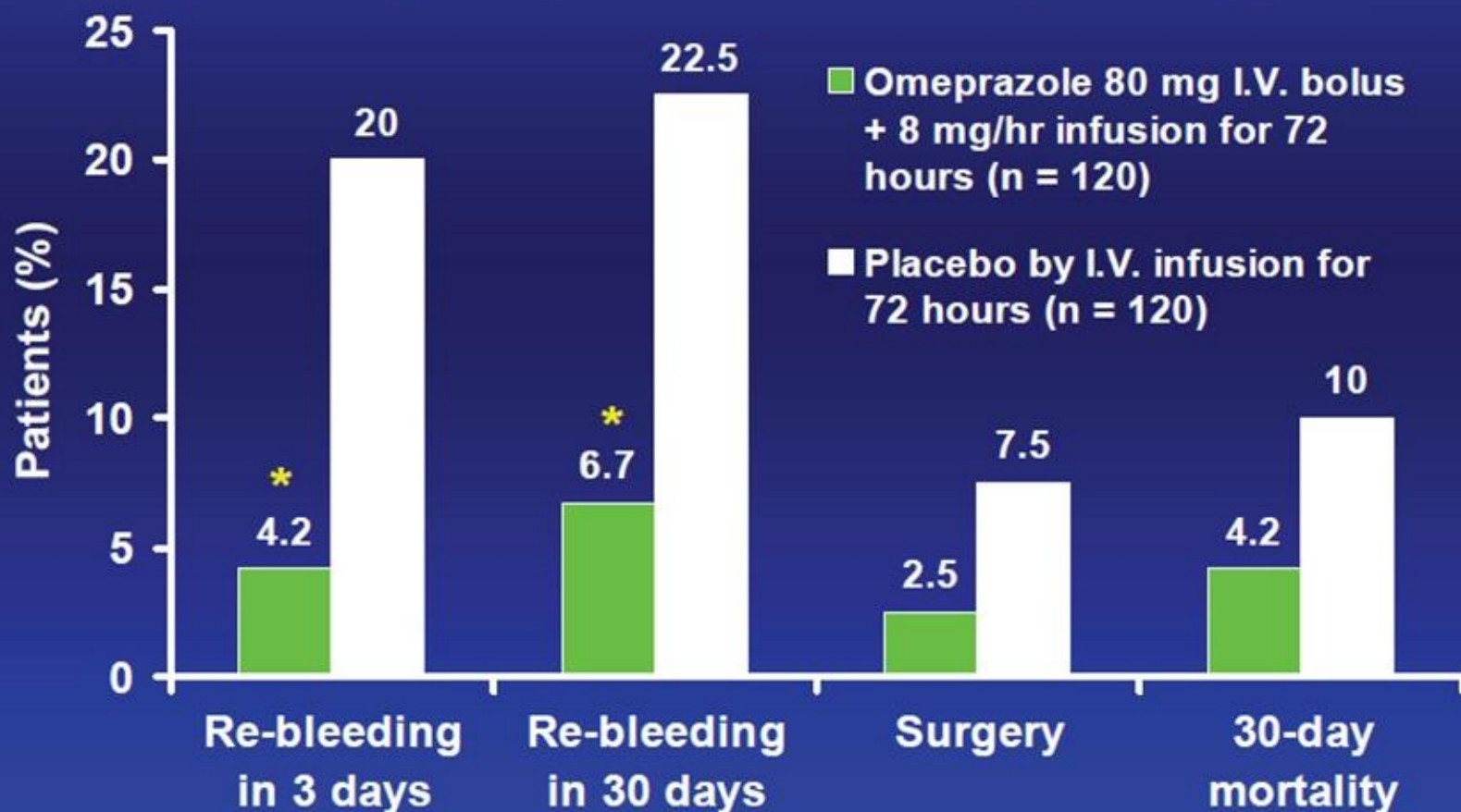
Collins and Langman, New Engl J Med 1985; 313: 660
Levine et al, Aliment Pharmacol Ther 2002; 16: 1137

Somatostatin / Octreotide for Non-Variceal UGI Bleeding

- **Significant decrease in bleeding by 47%**
 - **More effective in ulcer bleeding (52%) than in non-ulcer non-variceal bleeding (38%)**
- **No significant reduction in need for emergency surgery**
- **Rarely used because of availability of PPIs and high cost**
- **May be an option when cause of bleeding is not clear (variceal vs. non-variceal) prior to diagnostic / therapeutic endoscopy**

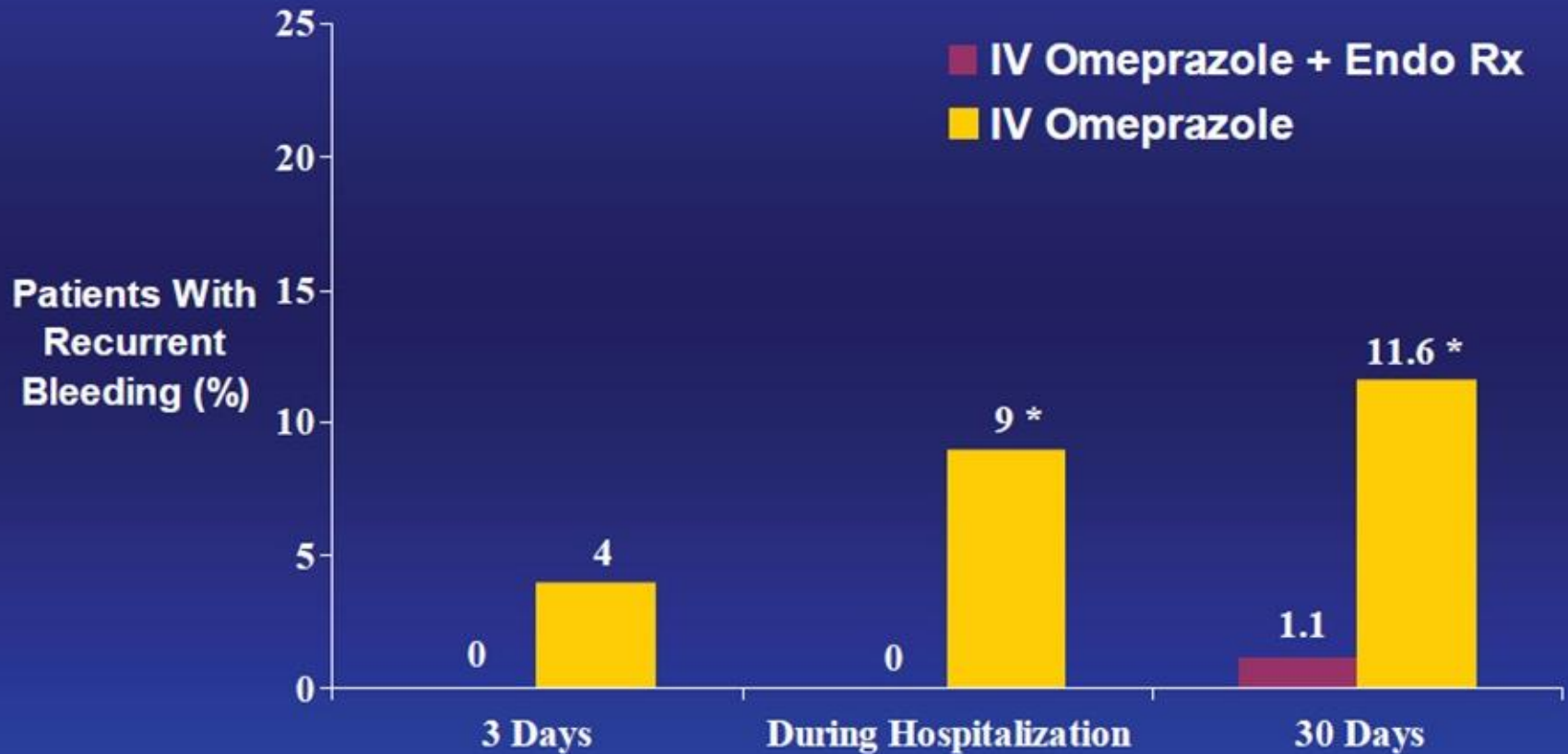
Randomized Placebo-Controlled Comparison of IV PPI in Bleeding Peptic Ulcer

- All patients had actively bleeding vessel or a non-bleeding visible vessel (NBVV) and received endoscopic therapy



* $p < 0.001$ vs. placebo

IV PPI Therapy Alone is Insufficient



* $P < 0.05$.

Adapted from: Sung et al, *Ann Intern Med.* 2003; 139: 237

Initial assessment and risk stratification

Hemodynamic status

&

Resuscitative measures

Initial assessment and risk stratification

Blood transfusions should target **Hb \geq 7** g/dl

(higher Hb targeted in patients with clinical evidence of intravascular volume depletion or comorbidities)

Initial assessment and risk stratification

Risk assessment →

Stratify patients: higher Vs lower risk

(assist in initial decisions such as timing of endoscopy, time of discharge, and level of care)

Initial assessment and risk stratification

Discharge from the emergency department w/out inpatient endoscopy may be considered in patients w/:

urea **< 18** mg/dl;

Hb **≥ 13** g/dl for men (12 g/dl for women),

systolic BP **≥ 110** mm Hg;

pulse **< 100** beats / min;

and **absence** of melena, syncope, cardiac failure, and liver disease

(< 1% chance of requiring intervention).

Pre-endoscopic medical therapy

IV Erythromycin

(250 mg, 30 min before endoscopy)

Pre-endoscopic medical therapy

IV PPI

(80 mg bolus → 8 mg/h infusion)

↓ proportion of patients who have higher risk stigmata of hemorrhage at endoscopy and who receive endoscopic therapy.

(PPIs do not improve clinical outcomes such as further bleeding, surgery, or death).

Gastric pH and Clinical Effect

**Gastric
pH**

Clinical Effect

>4

Pepsin inactivated

Stress Ulcer Prophylaxis

>6

**Functional coagulation
and platelet aggregation**

**Reduction of rebleeding
after endoscopic
intervention**

>7

Pepsin denatured

Pre-endoscopic medical therapy

If endoscopy will be delayed or cannot be performed, intravenous PPI is recommended to reduce further bleeding

Pre-endoscopic medical therapy

Gastric lavage

Nasogastric or orogastric lavage is not required in patients with UGIB for diagnosis, prognosis, visualization, or therapeutic effect

Timing of endoscopy

Patients with UGIB should generally undergo

endoscopy within **24 h** of admission,

following resuscitative efforts to optimize hemodynamic parameters and other medical problems

Timing of endoscopy

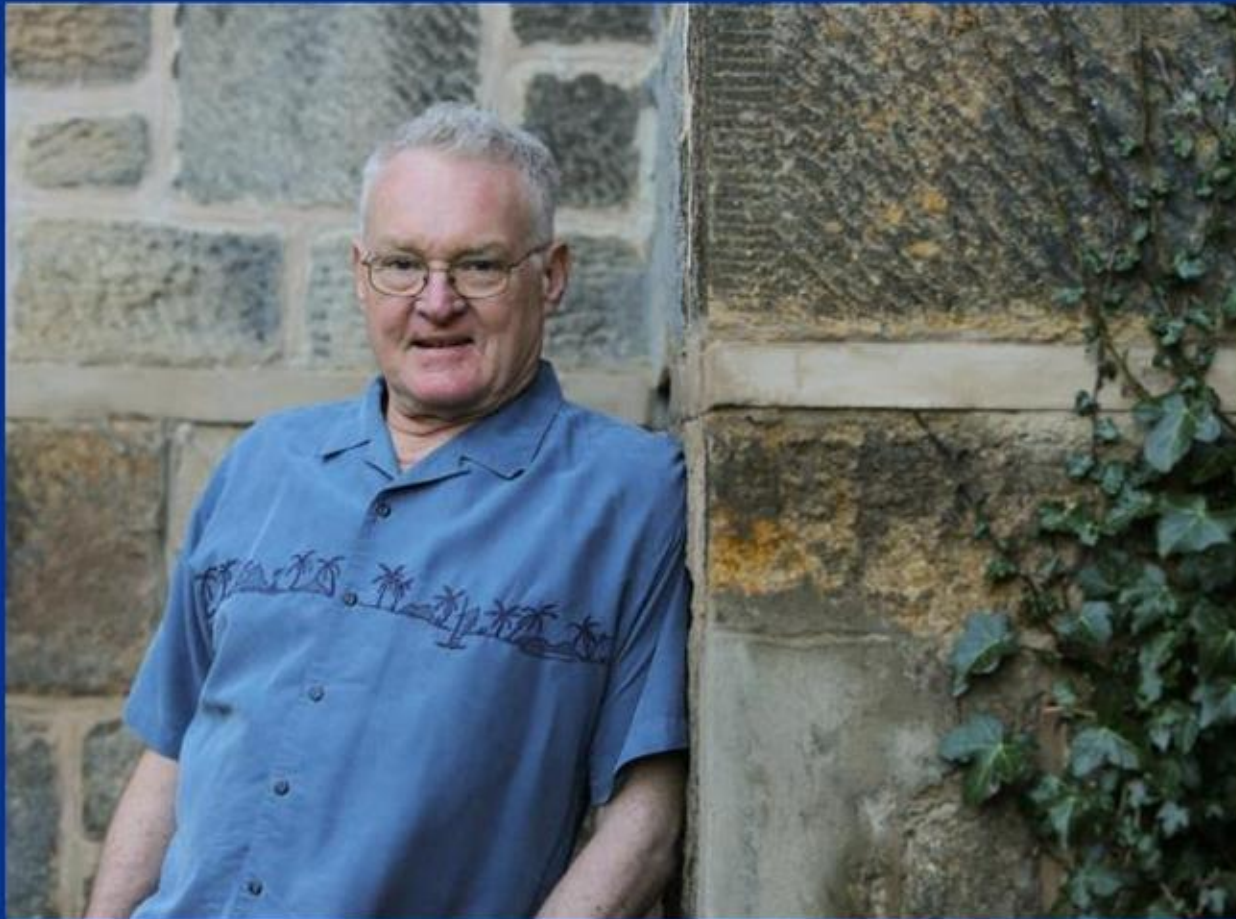
Patients with higher risk clinical features
(e.g., tachycardia, hypotension, bloody emesis or
nasogastric aspirate in hospital)



12 h

Endoscopy with **12 h** may be considered
to potentially improve clinical outcomes

Oliver Blatchford



Blatchford Score



Blatchford Score



Risk Assessment

Blatchford Score

Blatchford bleeding score Predicts: Need of EGD/PRBC	BUN	18 - 22	2	Hb	M	F	Sys BP	Others					
		22 - 28	3	12-13	1	-	100 - 110	1	HR	Two Blacks		Two Failures	
		28 - 70	4	10-12	3	1	90 - 100	2	≥100	Stool (Melana)	Out (Syncope)	Liver	Cardiac
		≥70	6	< 10	6		<90	3	1	1	2	2	2
		Score	•score ≤2: ↓ risk ± D/C (OP management) •score ≥6: >50% require intervention (EGD/PRBCs)										

Timothy Rockall



Rockall Score

	0	1	2	3
Age	< 60	60-79	> 80	
BP & HR	BP > 100 HR < 100	BP > 100 HR > 100	BP < 100	
Co-morbidities	None	-	CCF / IHD major co-morbidity	AKI, liver failure, metastatic Ca
Diagnosis	Mallory-Weiss / no pathology	All other	Malignancy	
Bleeding on endoscopy?	None or dark spots only	-	Blood, clot, spurting vessel	

Rockall Score (points)	Mortality
3	3%
4	6%
5	12%
6	17%
7	27%
8	40%

Repeat endoscopy

Routine second-look endoscopy, in which repeat endoscopy is performed 24 h after initial endoscopic hemostatic therapy, is not recommended.

Unless:

- There is a clinical evidence of recurrent bleeding.
- If further bleeding occurs after a second endoscopic therapeutic session, surgery or interventional radiology with transcatheter arterial embolization is generally employed (Conditional recommendation).

Rebleeding after 2nd EGD

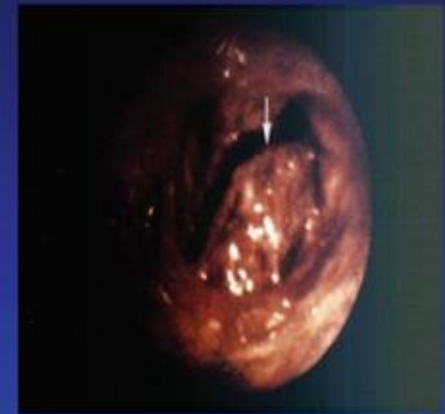
If further bleeding occurs after a second endoscopic therapeutic session:

Surgery or interventional radiology with transcatheter arterial embolization is generally employed.

Non PUD Bleeding lesions

Mallory Weiss tears

- Painless upper GI bleeding due to mucosal tear(s) near EG junction, usually on the gastric side.
- Contrasted with intramural hematoma and esophageal rupture (Boorhaave's)

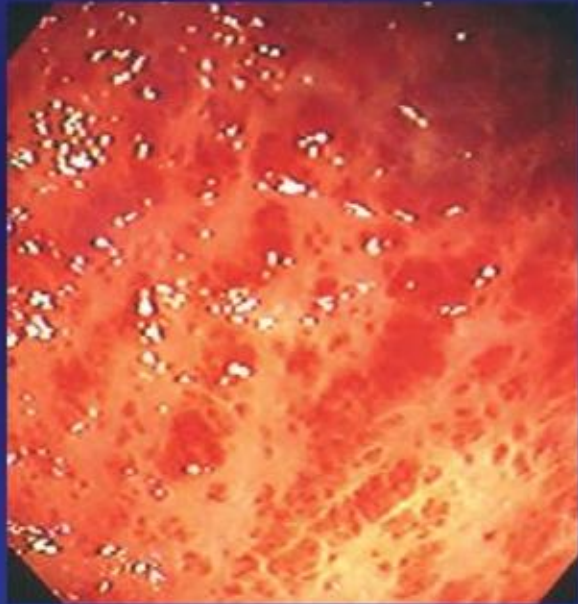


Vascular lesions

- Vascular ectasias
 - angiodysplasia, telangiectasia
- Gastric Antral Vascular Ectasia
 (“Watermelon stomach”)
- Dieulofoy’ s lesion
- Portal hypertensive gastropathy
- Cameron’ s lesions

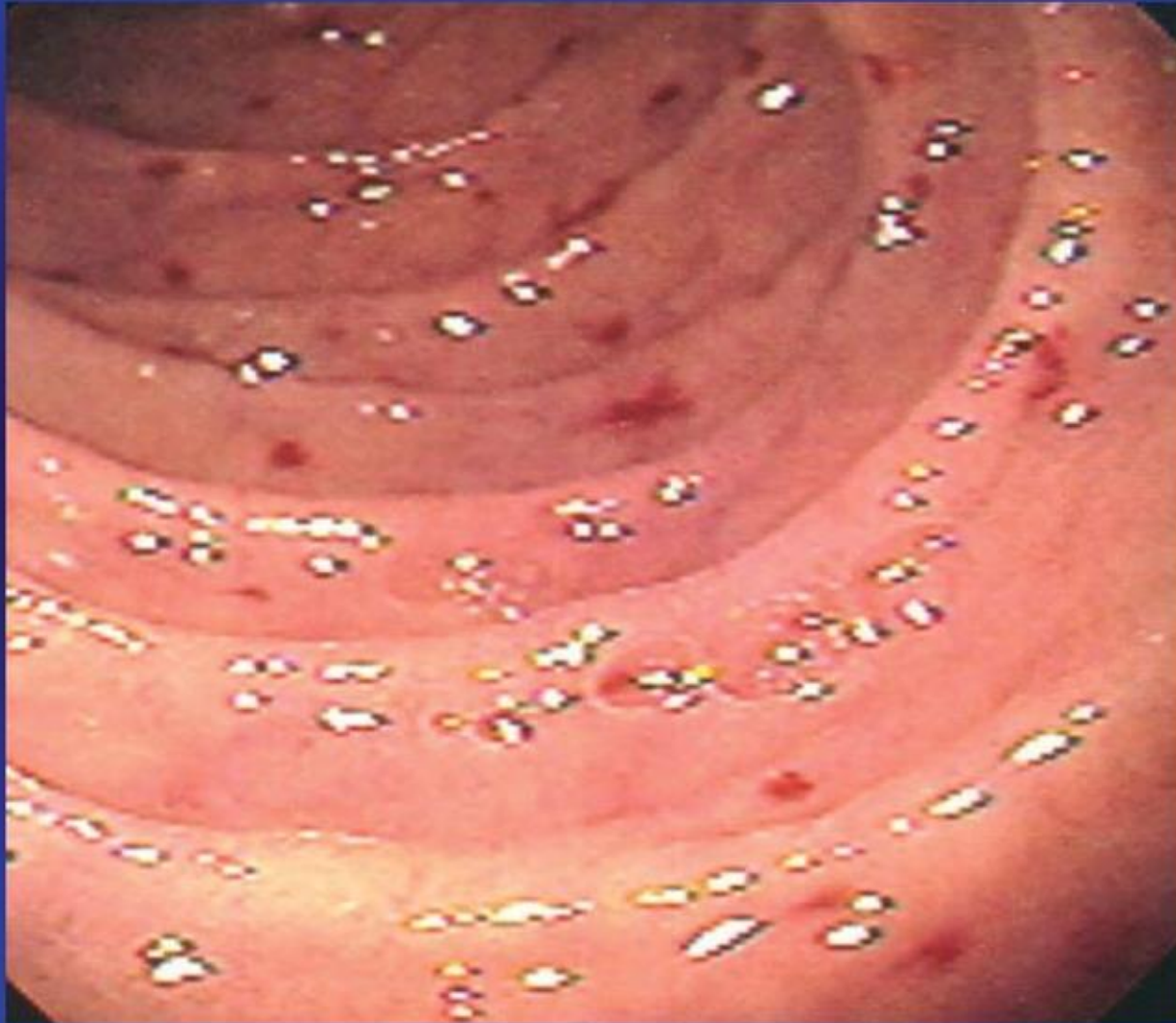
Gastric Antral Vascular Ectasia (GAVE)

Before, during, and after Endoscopic Therapy



Photographs Courtesy Brian Fennerty, MD

Duodenal Angioectasia



Acquired

aging

PSS

CREST

radiation

Hereditary

lips

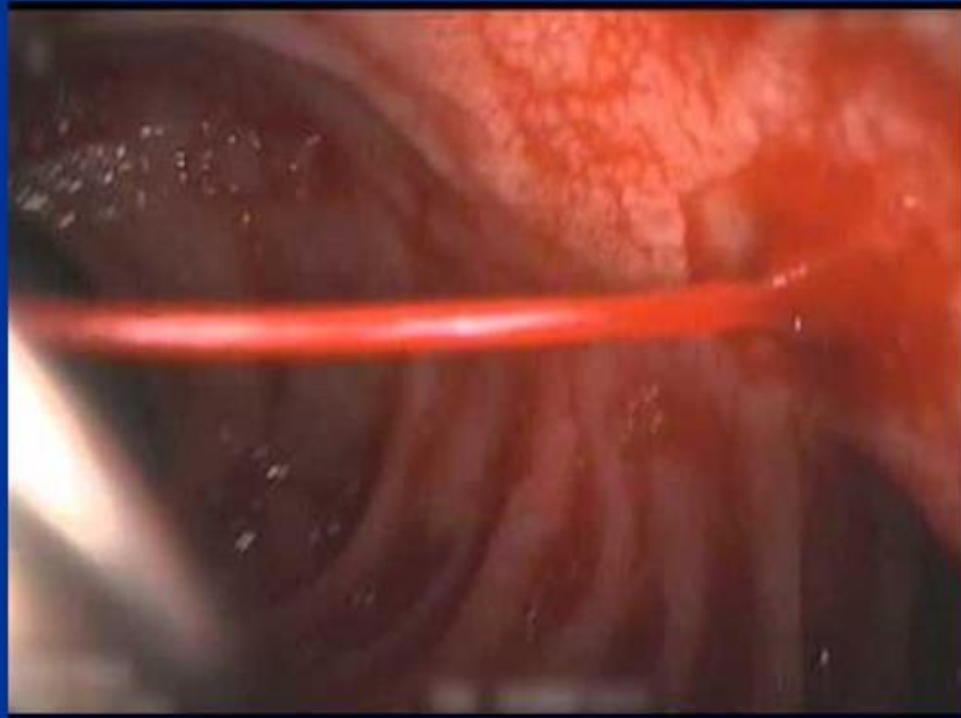
nose



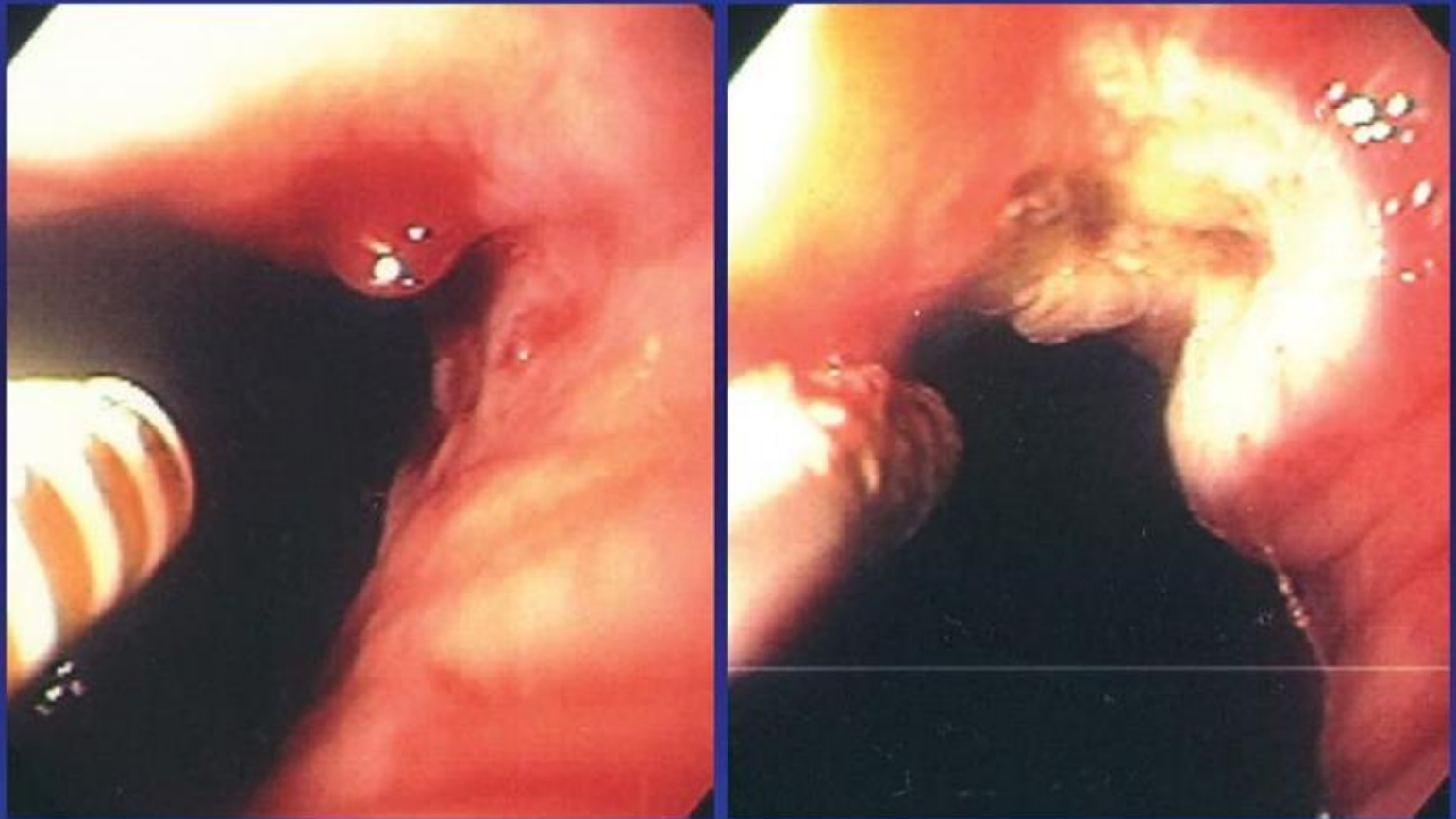
Dieulafoy's Lesion

- Abnormally large submucosal artery
- Proximal stomach (duodenum, elsewhere)
- Intermittent, painless massive bleeding
- Often difficult to identify endoscopically
- Endoscopic therapy (epinephrine, polidocanol) ultimately effective for hemostasis in 96%
- Long-term hemostasis in 85-90%
- Late (post-discharge) bleeding after successful endoscopic hemostasis uncommon
 - 5% or less after 2 years follow-up





Dieulafoy's lesion



Photographs Courtesy Brian Fennerty, MD

Portal Hypertensive Gastropathy



Cameron's Lesions

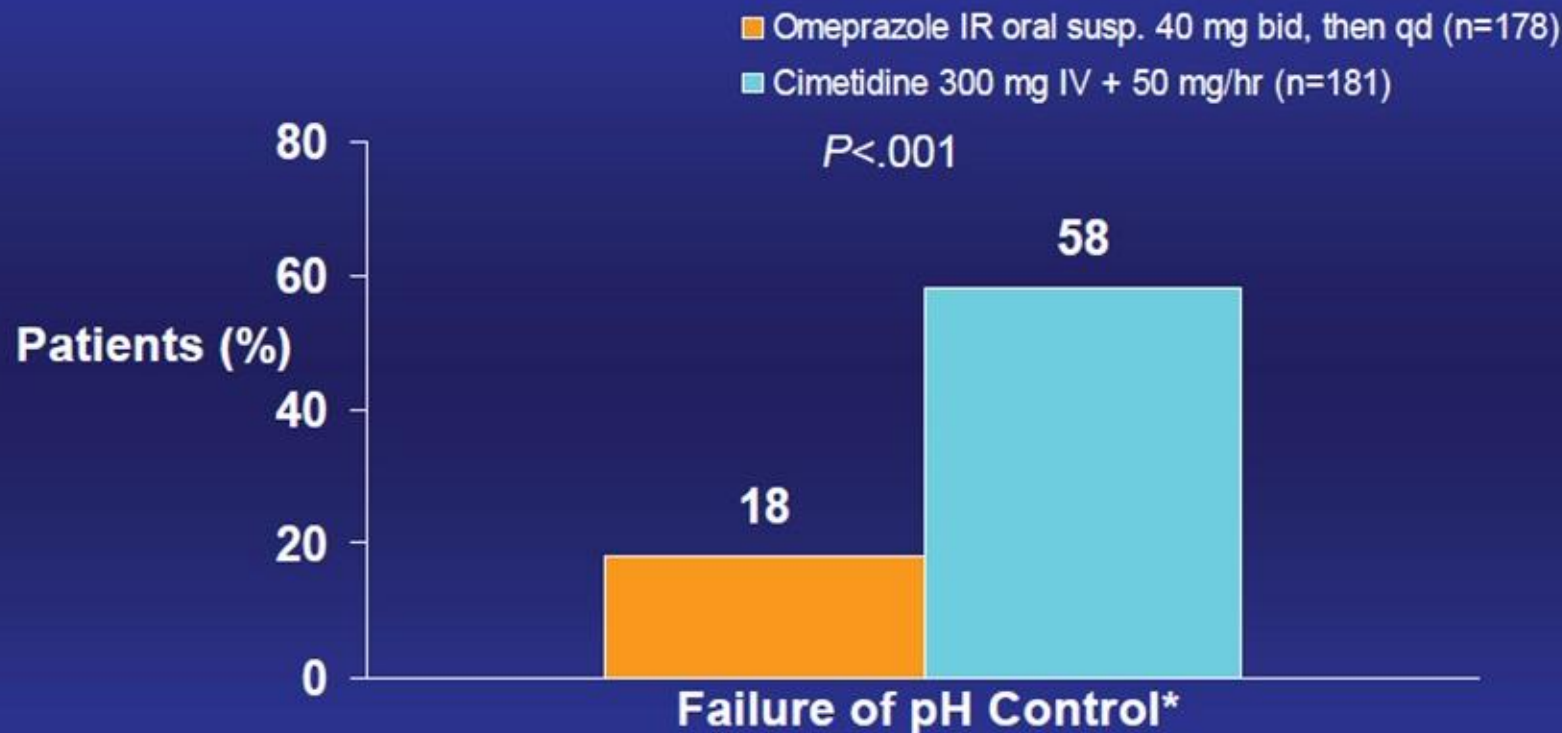
- Linear erosions in a hiatus hernia
- Usually sliding hernia
- Chronic or acute bleeding
- No abdominal pain, but may have reflux symptoms
- RX: Iron \pm PPI



Stress Ulcer Bleeding

- **Patients admitted to an ICU demonstrate endoscopic evidence of GI damage within 24 hours**
- **Historically, GI bleeding occurred in approximately 15% of seriously ill ICU patients without prophylactic therapy**
- **Much lower now with improved ICU care**
- **Current incidence of clinically significant bleeding is 1.5% or less**

Stress Ulcer Prophylaxis: H₂RA vs PPI



359 mechanically-ventilated ICU patients with 1 additional risk factor.

UGI bleeding rate: 6.8% (cimetidine) vs. 4.5% (omeprazole) ⇒ noninferiority of PPI

*2 consecutive aspirates with pH ≤ 4

Adapted from: Conrad et al, *Crit Care Med* 2005; 33: 760

Risk Factors for Clinically Important UGI Bleeding in ICU Patients

Risk Factors	Odds Ratio	P Value
Respiratory failure	15.6	<0.001
Coagulopathy	4.3	<0.001
Hypotension	3.7	0.08
Sepsis	2.0	0.17
Hepatic failure	1.6	0.27
Renal failure	1.6	0.26
Glucocorticoid administration	1.5	0.26
Organ transplantation	1.5	0.42
Anti-coagulant therapy	1.1	0.88
Enteral feeding	1.0	0.99

Management of Acute GI Bleeding

Initial Management

IV Access

Hemodynamic Assessment

CBC, PT/ PTT, LFTs, electrolytes/creatinine

Type and Cross

Resuscitation Measures

NPO



Assess Initial Risk

- Age >60 years
- Comorbidity
- Low systolic blood pressure
- Shock
- Ongoing bleed
- Prolonged PT
- Erratic mental status

High Risk

Low Risk

ICU/Surgical consult

Med./Surg. Ward

Endoscopy ± Hemostasis



Management of Acute GI Bleeding (cont' d)

Endoscopy ± Hemostasis



Evaluate Risk for Rebleed

High Risk

(active bleed,
visible vessel)

adherent clot

Low Risk

(clean base, flat spot)

Therapeutic Endoscopy
IV PPI
ICU
Surgical Consult

Treat Underlying Ulcer
Oral PPI
Ward (or even D/C)